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Sustainability performance disclosures: The case of independent power producers

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ABSTRACT

Independent power producers (IPPs) investing across borders represent a crucial sector that produces an adverse impact on greenhouse gas emissions (GHG). The main purpose of this study is to articulate issues pertinent to sustainability performance among contemporary IPPs which seek funding from the capital markets. A framework employing a sustainability performance scorecard is developed based on an interdisciplinary literature review that spans the fields of corporate finance, financial reporting and sustainability. By examining the sustainability performance as disclosed by three cross-border IPPs from the U.S., Europe and the emerging economy of Asia, this comparative case study unveils the current weaknesses in comparability, relevance and usefulness in disclosures among the IPPs. It points out potential information asymmetry to decision making of the primary stakeholders who seek to invest in renewable and sustainable energy while countering short-termism over financial returns. A concerted policy effort on disclosures about sustainability performance would be crucial to channeling effective private investments into the development of renewable and sustainable energy.

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1. Introduction

Publicly listed enterprises have become aware of the need to do “good,” and many of them have perceived corporate social responsibilities as a means for them to improve their public relations. Critics are skeptical about their motives and actual performance in socially responsible matters. Because climate change has become an important cross-border environmental issue, independent electric power producers (IPPs) are under gradually increasing pressure from regulators and the public to demonstrate their commitment to limiting further greenhouse gas emissions (GHG).

In particular, there are studies indicating the critical role of corporate disclosures on sustainability and compliance with certain environmental standards, suggesting a possible influence of culture and behavior in the context of sustainability. Nonetheless, there are concerns about the completeness of disclosures under the current regulation that may neglect the externality and the true impact on the environment. This voluntary disclosure of firms operating in global capital markets would be subject to the need to balance short-term pressures on financial performance with the need to deal with investor relations. Disclosures could be utilized as a tool for the development of investor relations rather than for providing assurances about sustainability.

As it is neither customary nor practical for an auditor to give an opinion on the truth and fairness of a company’s overall disclosures in its annual report, their relevance and reliability are particularly questionable, as suggested in previous studies. In light of the interdisciplinary issues involved, this article begins with a literature review related to sustainability performance and reporting and then explores the development of a scorecard for performance in terms of sustainability. With reference to the importance of the IPP sector to GHG as the world seeks to look into regulatory measures to deal with climate change, this article attempts to critically examine sustainability performance and reporting among three multinational IPPs. The implications concerning aligning long-term economic interests with sustainability performance are also explored.

2. Emerging issues on disclosure about sustainability

As there is increasing concern from the public over corporate social responsibility, corporations have become aware of the need to communicate their performance to stakeholders in terms of social responsibility. Especially when the public is concerned about the polluted environment and the issues associated with climate change, a number of corporations tend to “*jump on the bandwagon*” to promote their green features. For instance, Saha and Darnton [1] investigated the discrepancies between companies’ publicized green strategies and what they actually practice in operations through case studies, finding that there was a significant gap between the environmental impact that they attempted to mitigate and the size of the environmental impact. It was noted that green practice was particularly inconsistent across international operations, whereas local issues, government legislation and stakeholder pressure were the driving forces behind their green initiatives [1].

In fact, the problem with voluntary reporting by companies on green and sustainability could be somewhat overstated in terms of their actual commitment. Such a drive for voluntary reporting could only be motivated by the desire to serve the key external stakeholders’ requirements. As expressed by Buhr [2], “*...waiting for voluntary reporting standards or the merits of peer pressure to raise bar for everyone is overly optimistic and naive... The general idea is that better disclosure equals more transparency which equals more accountability which equals better sustainability performance*”. It was unveiled that the current practice of reporting business information through Management Discussion and Analysis (MD&A), a report mandated by the regulatory body, might not guarantee the credibility and reliability of such information, as it could be embedded with materials created for the purpose of public relations [2].

To enable the comparison of sustainability accounting, there are initiatives by the regulators to develop compliance standards for corporations to report on sustainability issues. As explored by Adams and Narayanan [3], there have been a number of bodies from different countries to establish standards relating to sustainable development and environmental management systems. Nonetheless, multinational firms operating in a number of jurisdictions need to observe various local requirements and stakeholders’ specific interests.

Adams and Narayanan [3] proposed that there could be sustainability issues in an industry that have not been addressed in a general guideline; the convergence of sustainability reporting guidelines would be unlikely unless there was a consensus about accountability for sustainability at the governance level. Concerning GHG emissions as a leading cause of global warming, Fornaro et al. [4] advocated the need to develop global accounting guidance to ensure consistency and transparency on reporting issues pertinent to GHG emissions, as there are emerging requirements by the U.S. government, EU countries and others to set a target level of emissions for companies. This so-called “cap-and trade” program would create economic incentives for related regulatory compliance and reporting requirements.

With respect to the development of standards, Global Reporting Initiative (GRI), a network-based organization, initiated the development of a sustainability reporting framework and released its first version of the guidelines in 2000 [5]. GRI aims to continuously improve its guidelines and to promote their application worldwide.

3. The role of stakeholders and the capital market

3.1. *Influence of primary stakeholders*

External stakeholders have become critical about the need for corporations to deliver corporate social responsibility. As reviewed by Tilt [6], there are various groups of external stakeholders, including the primary stakeholders who are predominantly concerned about economic sustainability, such as shareholders and investment analysts who need information for making decisions, as well as secondary stakeholders, who are not directly engaged in transactions with a corporation. Primary stakeholders are concerned about improper environmental practices, as they could increase the liabilities and risks faced by the firm, which would, in turn, cause diminishing profits and financial losses in many cases. Pressures from other external stakeholders, such as financial institutions and customers, seem to arise for critical rather than moral reasons when such issues could affect a corporation’s financial performance. Arguably there ought to be an underlying alignment between the economic value of sustainability and the primary stakeholders’ long-term economic interests.

3.2. *Problems with short-termism*

Given the concerns over sustainability, has the market functioned effectively for the stakeholders’ interests in the longer run? Some previous studies about the capital market have long indicated that the existing problems of financial short-termism that threaten long-term economic growth. For instance, Thakor [7] pointed out the problems with myopia in real investment decisions, which were distorted toward faster pay-off projects as a result of “preoccupation” with short-term profits. Porter [8] blamed the short-term

profit-seeking of U.S. managers, ineffective corporate governance by directors and the resulting high cost of capital. Moreover, in another study, managers in the U.K. responsible for research and development claimed that capital markets had an impact on putting inappropriate short-term measures on management performance [9]. Financial directors of listed companies were also found to focus on short-term results due to the emphasis of the capital market on figures of reported earnings [10].

However, institutional investors have become increasingly concerned about the performance of listed companies and the sustainability of their earnings. Marston and Craven [11] investigated the influence of institutional investors in the context of short-termism on company performance and found a meaningful relationship. Subsequently, Solomon and Solomon [12] suggested the effectiveness of reform on corporate governance with active shareholders of institutional investors and written voting policy documents for the development of longer-lasting and stronger links with their investee companies.

3.3. Decision making for "green" investments and long-termism

The concept of socially responsible investment (SRI) or sustainable investing has gained momentum among the investment community in recent years. As reported by Robins [13], some of the advocators included the conservative pension funds that had developed investment strategies to integrate environmental, social and governance issues into their investment decision-making process. The communities have expanded with credit-rating agencies and other practitioners while recreating a new set of values and expectations among the active investors. Robins [13] added, "*In essence, sustainable investors recognize that physical, regulatory, competitive, reputational and social pressures are driving environmental and social issues into the heart of market practice and thus the ability of companies to generate value for investors over the long term.*"

Under the current global concerns about climate change, there are emergent risks that affect business operations and, consequently, the financial performance and sustainability of a company. Because investors are concerned about long-term results, company managers would probably not be acting in the interest of the shareholders if they fail to take action to deal with risks associated with climate change [14,15]; therefore, corporations should assume a fiduciary duty to their owners, for instance, through investing activities that could mitigate problems with GHG emissions.

Primary stakeholders would ultimately look into the financial performance of their investments as key criteria in their ultimate decision-making. In a study about sustainable equity investing, Krosinsky [16] unveiled that some sustainable investing funds had, in fact, outperformed traditional funds in terms of long-term investment returns. This remarkable financial performance has created strong interest among the investor groups seeking long-term results in developing a portfolio of sustainable investments. This augmented stakeholders' awareness is expected to engender forces to drive changes in the emphasis of corporate disclosures.

4. The quest for an integrated framework

4.1. Usefulness of sustainability disclosure

Although primary stakeholders are increasingly keen to obtain information about a company's sustainability, there is skepticism about the availability and usefulness of pertinent information disclosed. In a study about social and environmental disclosure, Murray et al. [17] suggested that in the long run, there would be an underlying relationship between the predilection toward such disclosure and a consistently high return of shares. In other words, there could be predictive value in the disclosed information on sustainability. Based on the content analysis of the annual reports of listed companies, the authors suggested the underlying role of the financial markets to contribute to the development of social responsibility and sustainability [17].

For the primary stakeholders to make an assessment about a company's sustainability, pertinent information needs to be reliable and relevant to decisions regarding committing to long-term investments. Otherwise, there would be an underlying asymmetry in information on a company's sustainability for future growth and development. In a study about corporate sustainability reporting, Milne and Gray [18] emphasized the critical importance of the quality of reports and disclosures about sustainability as well as the variations in reporting among the multinational corporations. In the absence of any consistency, it is very difficult for primary stakeholders under the current unstructured sustainability reporting system to assess the associated risk and opportunity.

4.2. Relevant information about sustainability

A key challenge with sustainability reporting is to determine the relevance of information reported by companies in certain industries. As noted by Adams and Narayanan [3], there could be specific sustainability issues in an industry not addressed in a general guideline. The range of reported information may need to be standardized but would have to be modified and specified according to the characteristics of a particular industry.

A corporation needs to balance both short-term and long-term interests in the course of pursuing sustainability [3]. To finance such sustainable growth and development, the capital structure of corporations could also make a significant difference in investing for sustainability and could therefore be relevant. In particular, Berglot and Thadden [19] claimed that the use of an optimal capital structure with multiple investors specialized in short-term and long-term claims would be superior to a structure with only one type of claim because of the incentives that would be involved. The capital structure of a corporation could have implications in its pursuit of sustainability performance.

4.3. Comparability

Because sustainability issues are global and span borders, it becomes quite critical for the reported information to be comparable among the companies that operate in the same industry or sector. Comparability in the financial reporting framework would enable the primary stakeholders, particularly the fund managers, to make an accurate analysis and interpretation of the reported information by multinational corporations on a period-to-period basis.

4.4. Constructing a framework for a sustainability performance scorecard

To understand a company's sustainability, it would be necessary to review not only a company's past performance but also its present commitments and future prospects as to sustainability in the long run, with reference to the prior articulations in Sections 3.2 and 3.3. Moreover, the concept of causal relationships in performance measurement systems has long been advocated in the studies of the well-known balanced scorecard developed by Kaplan and Norton [20,21]. With an objective of enabling comparability, the range of relevant information needs to be clarified. Such information should provide meaningful, predictive values or assume the underlying causal relationship with a company's future sustainable business performance.

Table 1
Framework of sustainability performance scorecard for the past, present and future.

	Past (historical performance and compliance)	Present (current practice and system in place)	Future (future plan and development)
Financial	Financial performance	Current equity and debt structure	Optimizing capital structure
	Operational performance and related activities	Present plan to invest for sustainability	Articulating the prospect to remain financially sustainable
	Past capital structure		
Tangibles	Property, plant and equipment	Existing facilities and infrastructure	Capital investment plans to improve sustainability
		Technological system in place	
Intangibles	Nurturing human capital development	Current human capital base	Further human capital development
	Success in research and development	Enterprise risk management system	Technological innovation for green developments
	Effective regulatory compliance	Knowledge management system	Other sustainable developments or initiatives
		Green supply chain management	
		Relevant policy in place	

Similar to the fundamental characteristics of the performance indicators in the balanced scorecard, a key assumption incorporated in this sustainability performance scorecard is the underlying causal relationship among the indicators for long-term sustainability performance. With reference to the resource-based view, deliberations about tangible assets would suggest the commitment of resources for infrastructural development that would last for a period of useful life. Disclosure about the complementarity of the existing infrastructure in relation to sustainability would also be useful information for the stakeholders. More importantly, it would be critical for stakeholders to understand whether there were commitments in intangibles that could drive a company toward future organic growth and sustainability performance with adequate human capital, research and development, management systems and the necessary technological innovation [22,23]. These intangible elements have been found to be crucial to induce the future performance of knowledge-intensive organizations that need to adopt new technologies. As reported by Rau et al. [24], the lag between the invention of advanced clean energies and their adoption would be one of the primary challenges for companies to deliver viable solutions to reducing GHG emissions despite the existence of new patents on renewable-energy technologies.

Financial indicators would reflect the overall past performance of a firm in utilizing various resources. Specific financial indicators would provide information about sources and uses of funds as well as the capital structure of a firm to reflect the expectation of returns by an array of capital providers [8–10].

Sustainability performance indicators (SPI) would be developed for effective comparison among multinational corporations. Adams and Frost [25] indicated that organizations tended to develop an integrated sustainability performance management at stages influenced and constrained by their existing processes. A framework of sustainability performance scorecard is provided under Table 1 based on the author's elaborated economic concepts regarding sustainability. An important component of this framework is to articulate the future sustainability of an organization in contrast with the past and present, whereas the other guidelines, including GRI, have mostly emphasized reporting indicators of past performance. Under the "Future" column, the scorecard would report on plans and targets to be achieved for a more sustainable future.

5. The case in point—multinational IPPs operating in the Asia-Pacific Region

5.1. Comparative case studies of three global IPPs

This study has adopted the case study approach to examine the disclosures on sustainability performance among three major global IPPs. As noted by Yin [26], a comparative case study would enable comparison and contrast of the organizations under study. In this comparative case study, three major international IPPs have been selected to explore their disclosures on sustainability. All of them are multinational corporations with direct investments of power-generating facilities not only in their home countries but also with significant exposure in the Asia-Pacific region.[1] AES Corporation (AES) is an IPP based in the United States that was started in the 1980s when the U.S. power market was liberalized for private investments. AES has now become a global player with investments in power-generating facilities over five continents.[2] CLP Group (CLP), based in Hong Kong, started out as an electricity utility in Hong Kong and emerged as a regional IPP with a diversified portfolio spanning the Asia-Pacific region and Australia and featuring strong exposure in China. EDF Group (EDF) was established by the French Government and was a state-owned utility after World War II but was developed into a publicly listed company with a strong presence in the European electricity market as well as investments in China and Southeast Asia.[3]

5.2. Climate change and the predominant role of the power-generating sector

The phenomenon of climate change has called for solutions to mitigate and adapt to the impacts on businesses. In a study on the impacts of climate change in the Asia-Pacific region, Kainuma et al. [27] revealed that climate change could cause serious damage in low-latitude regions as well as developing countries of tropical and sub-tropical regions. Countries would need to adopt technological solutions and policy measures, such as the targets set in the Kyoto protocol, for the timely adoption and diffusion of mitigation options to stabilize and reduce GHG emissions. The global temperature would otherwise continue to increase, having severe impacts on the water resource supply, agriculture production, vegetation and human health [27].

The power-generating sector, which generates electricity for consumers, is considered to be the predominant source of CO_2 and SO_2 emissions [27]. Even the use of LPG would continue to generate carbon emissions despite being cleaner than coal. For instance, China is expected to continue to consume a large amount of coal for

[1] Each of the three selected multinational IPPs has direct investments in at least four countries in the Asia-Pacific region with at least ten years of operating experience.

[2] AES started investing in the power market of China and other parts of the Asia-Pacific region since the 1990s and owns power-generating facilities in China, India, the Philippines and Sri Lanka.

[3] EDF currently has investments in China, Vietnam, Lao and Thailand.

its future energy consumption, with the power-generating sector accounting for about 67% of the country's primary energy consumption [28]. To rectify the current energy structure, which relies on coal for power generation, the country's energy policy has been revised to increase the use of nuclear power and various renewable energy sources. Its role in mitigating the impacts of climate change on the rest of the world is also advocated. Nevertheless, the effective implementation of these new policies will be critical to ensure that there are mitigating effects to the electric power-generating sector.

Independent power producers (IPPs) are typically considered non-public utility power-generating firms, which are privately owned or owned by a number of investors and publicly listed on a stock exchange for corporate finance purposes. After several decades of the liberalization of the sector toward more market-based electricity services, a number of IPPs have become cross-border or even global players that invest and manage a sizable portfolio of power-generating facilities. Given their global presence and their increasing influence, this has become a sector that serves the general public, and their portfolio of facilities has a direct and significant impact on mitigating climate change.

Based on a study on the full social costs of various sources of electric power, it was found that the existing market had considered their lifecycle costs and their total costs to the society had been distorted because the presence of externalities was neglected [29]. As a result, there is still no alignment between the true electricity costs and prices, although the operators do not attempt to internalize such costs. In particular, renewable energy technologies could offer the cheapest forms of power generation if these externalities are considered. The renewable energy technologies with the lowest full social costs include offshore wind, onshore wind, geothermal, hydroelectric, biomass and solar thermal power. In essence, the current regulatory environment dampens the development of renewable power systems by "flagrantly" subsidizing conventional fuel and failing to take into account the full social costs associated with GHG emissions [30].

In another study by Sovacool and Watts [30], a completely renewable electric sector, in which wind farms, solar systems, bioelectric power stations, hydroelectric facilities, and geothermal power plants generate 100% of the total electricity produced, would be possible utilizing today's technology if the right mix of incentives were provided. However, its success will depend largely on the policy mechanisms, regulatory measures and social awareness needed to bring it about. Moreover, the alignment of the economic interests of the key stakeholders in combination with the necessary absorption capacity of renewable energy technologies would be critical [31].

5.3. A comparative analysis

In this comparative analysis, key qualitative and quantitative disclosures provided by the three international IPPs are reviewed.[4] This analysis is undertaken to look into such cross-sectional information associated with the sustainability of the power sector through a sustainability performance scorecard for the past, present and future. This sustainability has to be upheld by power companies' past and current commitment as well as their actions and resource planning, which would increase their future sustainability under the emerging climate change scenario.

Summarizing the background of the three IPPs, Table 2 provides a fact sheet to delineate their key background information, including their primary stakeholders. On ownership, AES has the highest portion of institutional investors as their equity stakeholders, whereas the French government has continued to be the single largest investor in EDF. CLP, on the other hand, is still controlled by the founding shareholders, the Kadoorie family, who are based in Hong Kong, despite the increasing presence of institutional investors. Regarding capital structure, EDF carries the most amount of debt on its balance sheet, suggesting the availability of a relatively lower cost of capital that could be aligned with more long-term economic interests.

In making further comparisons, relevant disclosures about the past, present and future sustainability performance of the three IPPs is extracted and summarized in Table 3 based on the proposed framework illustrated in Table 1. Of the three firms, EDF has provided the most comprehensive disclosures about its sustainability in the past and in its existing plan, including the existence of its Sustainable Development Policy. Although CLP has issued a standalone sustainability report, it has not provided disclosures equivalent to EDF in terms of substance and alleged commitments. AES has only provided information about social responsibility and environment concerns on its corporate website but has not formally done so in its annual report. Specific disclosures on risk associated with regulatory measures on the environment were more structurally made in AES's fillings to its exchange regulator, particularly in defense of its financial sustainability.

Key disclosures of the three IPPs on their tangibles and intangibles are incorporated into the proposed sustainability performance scorecard as illustrated in Table 3.[5] Among the three players, the scorecard shows that AES has built a portfolio of power-generating facilities featuring the highest portion of renewable energy, at 21%, followed by EDF's 19% and CLP's insignificant level. EDF has maintained 52% of its installed capacity in nuclear power, which is claimed to be clean energy due to the lack of emissions produced.[6] CLP has a portfolio with the highest portion of non-gas fossil fuel at 57%, followed by AES's 46%, thereby demonstrating its continued reliance on unsustainable fuels. In addition to their existing infrastructure, Table 3 provides a summary of the important intangible resources that could be predictive of the three IPPs' future sustainability. Such information includes management systems in place, relevant human capital and innovation capabilities. With respect to their future investment plans, the scorecard indicates that all three of them have plans to expand their investments into renewable energy, but with various forms of commitment that remain difficult to be measured or used to create accountability.

With respect to future sustainability, both CLP and EDF have provided disclosures in their standalone reports, such as the development of human capital, innovation and R&D, as well as more specific plans and targets to increase their investments in renewable energy sources. The cover pages of their respective standalone reports on sustainability are provided in Fig. 1. EDF presented the most detailed information about their concerns over environmental and business risks associated with emerging climate change. CLP's approach to reporting sustainability appears somewhat informal and is only presented through some dialogues with various stakeholders, namely, investment analysts and customers. Although CLP pledged to reduce its carbon emissions by 75% by 2050–40 years in the future, there was no expressed interim target accountable by the present senior management.

4 Data are extracted from 2008 annual reports of the three IPPs.

5 Financial indicators are not incorporated into this illustrated scorecard, whereas there is limited information about expectations regarding the capital structure in the future. Basic information about the three IPPs' existing capital structure is summarized separately in Table 2.

6 According to the study by Sovacool (2009), the full social costs of nuclear energy could be much higher when taking its lifecycle into consideration.

Table 2
Basic background information on AES, CLP and EDF.[a]

Global presence	AES	CLP	EDF
	Asia (including China and Middle East), North America, Latin America, Europe, Africa	Asia-Pacific region, including Australia	Mostly Europe; also in U.S., China and Vietnam
Total installed capacity (GW)	43	17	127
Key investors			
Institutional investors	83.66%	39.27%	13.15%
Management/insider	0.54%	34.87%[b]	0%
Government	0%	0%	84.66%
Others	15.8%	25.86%	2.19%
Debt ratio	64.8%	52.4%	87.6%
Exchange regulators	U.S. SEC	HKSE	Euronext
Key operational compliance requirements	U.S. and other local regulators	HKSAR and other local regulators	EU and other local regulators

[a] Data are extracted from 2008 annual reports of the three IPPs.
[b] Shares owned by the Kadoorie Family.

6. Discussion

6.1. On comparability, relevance and usefulness to stakeholders

First, disclosures on sustainability among the three IPPs demonstrate that there is a limited comparability of the relevant information despite their presence in the same industrial sector [3]. Whereas the sustainability performance scorecard structurally unveils the availability of critical information relating to sustainability, these three players tend to maintain their respective reporting characteristics driven by respective compliance requirements and local regulatory concerns. As a state-controlled firm, EDF has demonstrated a strong commitment to sustainability with comprehensive information that is relevant and useful to the interests of the public stakeholders striving for a sustainable environment. CLP, on the other hand, has provided disclosure that is meaningful for maintaining fair investor relations but has done so with limited substance and a rather flimsy commitment to reducing GHG. AES, operating under the allegedly most efficient capital market in the world, which scrutinizes quarterly earnings, tends to focus on reporting for the sake of its financial sustainability.

In essence, the three cases suggest that the utility of sustainability could be different for each of them, as their immediate primary stakeholders might have differing primary concerns [6]. These primary stakeholders might not have an equivalent awareness about the sustainability issues and perhaps the perception about the risks involved. Despite the fact that they operate across borders, their home country's regulatory climate could have a significant influence on their sustainability disclosure. In fact, local cultural, economic and social factors could have an influence on the adoption of international standards and codes. Such information would not be the same in producing relevance to the end users, who are keen to understand their sustainability, especially their future prospects.

6.2. The drives for sustainability performance—"carrots and sticks"

The three cases demonstrate that there are underlying economic "carrots and sticks" that might influence sustainable investments in the sector. AES demonstrates its aggressiveness in expanding its renewable energy exposures under a majority of institutional



Fig. 1. Covers of sustainability reports by CLP and EDF.

Table 3
Reporting under a proposed framework using a sustainability performance scorecard.

		AES	CLP	EDF
Past	Nature of sustainability reporting (emission details; environmental impact)			
	Quantitative coverage in the annual report (beyond regular financial reporting)	Emphasis on financial sustainability	To reduce carbon emission by 75% by 2050 under its Climate Vision 2050	Reporting amount of CO_2 emission in both Annual Report and Sustainable Development Report
		Reporting amount of CO_2 emission under a section entitled "Environmental & Land Use"	No disclosure on the amount of CO_2 emission	
	Qualitative coverage in the report	A separate section or report on sustainability is unavailable; there is only a discussion about corporate responsibility and environmental on the corporate website.	Ongoing emission control projects and measures taken in the past	Sustainable Development Policy
			Sign-off by senior management and board members	Separate Sustainable Development Report with details regarding strategic priorities and social responsibilities Sign-off by senior management and board members
Present	Existing power-generating facilities by fuel types	21% renewables[a]	4% renewables	19% renewables
		46% non-gas fossil fuel 33% gas 0% nuclear	57% non-gas fossil fuel 27% gas 12% nuclear	25% non-gas fossil fuel 4% gas 52% nuclear
	System in place			
	Enterprise risk management	Listing of risk factors	A separate section to provide a Risk Management Report	Discussion about climate change-related risk
	Knowledge management	Limited coverage	Disclosure about development of a knowledge management system	Limited coverage
Future	Pertinent future plans and target	To expand "renewable business" including additional renewable facilities and carbon-offset projects, such as landfill gas	To increase investments in renewable energy projects in the future with reference to its Climate Vision 2050	To foster the development of renewable energies and energy eco-efficiency and to adopt sustainable development policy; current plans to invest in renewable energy
	Human capital development [b]	Not available	Internal staff development or hiring for the growing renewable portfolio	Disclosure about human resources development in Sustainable Development Report
	Innovation/research and development	Not available	In-house research institute for low-carbon technologies	Research projects for sustainable development and GHG emission-related solutions

[a] Including hydro, wind and solar.
[b] Past and present information on human capital is not provided in this summary. All three companies have disclosed some information about their past human capital development through staff training and development activities.

investors, which may seek long-term financial returns. Here, an efficient capital market might be associated with interest in sustainable development, as the risks associated with non-sustainable fuels may have been embedded in the cost of capital. Having an optimal capital structure, which features an optimal balance between equity and debt, may also require a balanced portfolio of capital investments. Although it is not the authors' intention to judge whether AES has the most optimal capital structure among the three, AES's current capital structure, with a debt ratio of 64.8% combined with a majority of institutional investors, appears to place it in a position to invest even more renewable energy facilities, reflecting an alignment to fulfill the management's fiduciary duties to the primary stakeholders with financial interest for long-term performance [12,14].

On the other hand, the presence of a state in an ownership structure, as in EDF, could insert the interests of the public, who strive for a more sustainable environment. EDF's sustainability disclosure and related commitments might reflect its consciousness of the regulatory system imposed by the state and, therefore, its accountability to the public at large. EDF demonstrates that it is not only a publicly listed company that seeks financial performance seemingly under a more long-term capital orientation but is also responsible for a sustainable environment and is thus in alignment with public values. The interests of the public at large, as secondary stakeholders being concerned about the environment in this case, would otherwise not considered if there were an overriding short-term economic interest [1]. However, this regulatory influence is not instituted equivalently among the three IPPs, given their varying ownership structures and respective local regulatory environments.

As a family-controlled entity with significant institutional participation, CLP's style of disclosing its sustainability appears to be providing the least substantiation. Its aim to achieve sustainability is shown to be a strong gesture used to cultivate relationships with a range of designated key stakeholders, but its apparent commitment to deliver sustainability performance in definitive terms particularly through renewable energy sources is rather limited. The underlying economic short-termism would coincide with its relatively lower amount of fixed claims to its assets in combination with the lax local regulatory measures imposed on the sector.[7]

[7] CLP's major investments are based in Hong Kong and are regulated under the Scheme of Control for the electricity market on a non-competition basis. The

6.3. A need to improve disclosures about sustainability performance

Although there is still no standard for reporting on sustainability, information that has implications regarding a company's future sustainability is useful for primary stakeholders in predicting its future performance. Because climate change is expected to create emerging risks in the operating environment, companies would need to think ahead in their strategy in mitigating and adapting to such risks. However, companies that neglect the potential to invest in more sustainable facilities could become less competitive under a landscape of technological innovation for sustainable solutions and mounting regulatory pressures. Have these emerging risks been effectively factored into most firms' cost of capital? Or, as has been suggested, are some of these firms only reporting in the pursuit of good investor and public relations rather than for their actual future sustainability performance [1]?

To reduce potential information asymmetry on sustainability, relevant information on a company's capability to show strong sustainability performance needs to be disclosed in a more comprehensive, structured and transparent manner. Are these companies equipped with the proper human capital, management systems and technological know-how to be sustainable in the future? Through a sustainability performance scorecard, this study examines the viability of integrating with other pertinent management information while reporting on sustainability [25]. It also suggests the existence of variations in the quality of sustainability performance as demonstrated in different voluntary disclosures.

As noted in prior studies, primary stakeholders could make use of relevant information to predict a company's sustainability and even its future financial returns [16,17]. The drive for good-quality reporting on sustainability would be driven by the concerted efforts of primary stakeholders with long-term financial interests and those with a fiduciary duty to the public at large. For the latter incentive, compliance requirements under a regulatory framework would enable consistency in sustainability disclosures. In the absence of such a regulatory framework across borders, voluntary reporting would continue to be driven by forces in the capital market or policy measures under various jurisdictions; however, it would be unrealistic to expect consistency across borders under the current global regulatory system.

6.4. Concluding remarks

As demonstrated in the sustainability performance scorecard for the three IPPs, a structured scorecard of relevant and useful information could enhance the comparability of sustainability performance and enable primary stakeholders to evaluate the prospects of long-term investments. Such a scorecard would unveil critical information about an organization's true commitment to investing in renewable and sustainable sources of energy in the long term. Among the cases, there appears to be insufficient information disclosed about intangible elements, namely human capital and technological innovation for augmenting renewable energy development despite their plans to increase such investments.

Under the existing financial reporting system, these companies do not exhibit their firm commitments of financial resources for investing in renewable and other sustainable energy facilities in a longer term. There are neither cohesive local regulatory nor compliance requirements on reporting sustainability performance. Relevant information about sustainability performance that concerns primary stakeholders who seek to make pertinent investment decisions is rarely made available within their voluntarily disclosed information. An integrated policy effort would be needed on disclosures about sustainability performance should we demand more effective resource allocation into investing in renewable and sustainable energy within the private sector.

Further studies on the development of a more comprehensive scorecard for sustainability performance should consider any emerging regulatory framework for mitigating climate change. This development would involve primary stakeholders who are concerned about the sustainability of their investments. Credit rating agencies and investment managers need to be involved in identifying their concerns and exploring the applications of such a scorecard to assess a company's sustainability performance in association with the overall investment risk. The link between sustainability and risk should be explored in future studies.

Finally, although GRI has developed a guideline supplement for the global electric utility sector, the further development and incorporation of indicators emphasizing future sustainability performance would greatly enhance its overall usefulness for primary stakeholders. However, issues relating to international compliance with sustainability disclosures should be further studied, particularly for the purpose of overcoming the cultural and economic barriers existing within both developed and emerging economies.

scheme has been criticized as out-of-date for not incorporating sufficient measures in dealing with emission problems. Nevertheless, in CLP's subsequent disclosures on sustainability, additional interim targets for 2020 and 2035 have been presented to demonstrate gradual increases in non-carbon emitting sources in order to meet its Climate Vision 2050.

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